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Non-Pharmacological Management of Pregnancy Anemia and Labor Acceleration: The Role of Date Fruit Consumption

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ABSTRACT

Anemia during pregnancy continues to be a significant public health issue, especially in low- and middle-income countries, often leading to severe maternal and neonatal complications. This study aimed to evaluate the relationship between date fruit consumption and improvements in hemoglobin levels, as well as the acceleration of Stage I labor among anemic pregnant women. A quasi-experimental design with a non-equivalent case-control approach was utilized, involving 48 pregnant women with anemia at Permata Bunda Clinic, Serang City, from March to August 2024. The intervention group consumed approximately 70 grams (5–7 fruits) of dates daily for four consecutive weeks before delivery, while the control group received standard iron supplementation alone. Hemoglobin levels were assessed using the cyanmethemoglobin method, and labor duration was measured using a standard partograph. Results showed a statistically significant improvement in hemoglobin levels ($p = 0.002$) and reduced duration of labor ($p < 0.002$) in the date-consuming group compared to the control group. These findings highlight date consumption as an effective, culturally acceptable, and practical strategy to manage anemia and accelerate labor among pregnant women, suggesting its integration into antenatal care programs.

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Kata kunci:

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ABSTRAK

Anemia pada kehamilan masih menjadi permasilahan kesehatan masyarakat yang signifikan, terutama di negara-negara berpenghasilan rendah dan menengah, yang sering menyebabkan komplikasi serius pada ibu dan bayi baru lahir. Penelitian ini bertujuan untuk mengevaluasi hubungan antara konsumsi buah kurma dengan peningkatan kadar hemoglobin serta percepatan proses persalinan tahap pertama pada ibu hamil anemia. Penelitian ini menggunakan desain kuasi-eksperimental dengan pendekatan non-equivalent case-control, melibatkan 48 ibu hamil anemia di Klinik Permata Bunda, Kota Serang, periode Maret hingga Agustus 2024. Kelompok intervensi mengonsumsi buah kurma sebanyak 70 gram (5–7 buah) setiap hari selama empat minggu berturut-turut menjelang persalinan, sementara kelompok kontrol hanya mendapat suplementasi zat besi standar. Kadar hemoglobin diukur menggunakan metode cyanmethemoglobin, dan durasi persalinan dinilai dengan partograf standar. Hasil penelitian menunjukkan peningkatan kadar hemoglobin yang signifikan secara statistik ($p = 0,002$) serta penurunan durasi persalinan yang signifikan ($p < 0,002$) pada kelompok yang mengonsumsi kurma dibanding kelompok kontrol. Temuan ini menunjukkan bahwa konsumsi kurma merupakan strategi yang efektif, praktis, dan dapat diterima secara budaya dalam mengelola anemia dan mempercepat proses persalinan pada ibu hamil, sehingga direkomendasikan untuk diintegrasikan ke dalam program pelayanan antenatal.

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INTRODUCTION

Anemia during pregnancy remains a significant public health issue worldwide, especially in low- and middle-income countries, where nutritional deficiencies are prevalent. The World Health Organization (2021) estimates that 37% of pregnant women globally are anemic, with the majority of cases caused by iron deficiency. In Indonesia, data from Riskesdas 2018 revealed that nearly 48.9% of pregnant women experience anemia. This condition, if left untreated, can lead to serious complications such as maternal mortality, low birth weight, preterm birth, and impaired fetal development (Kemenkes RI, 2018). These risks highlight the need for effective and accessible anemia prevention strategies that are culturally acceptable and nutritionally adequate.

While iron and folic acid supplementation remain the gold standard for preventing and treating anemia during pregnancy, their effectiveness is often hampered by low compliance due to side effects like gastrointestinal discomfort, nausea, and metallic taste (Okube et al., 2015; Nisar et al., 2020). Furthermore, in certain areas with limited healthcare access or low antenatal care coverage, consistent supplement distribution is not always guaranteed. These practical challenges underscore the importance of exploring non-pharmacological, food-based approaches that are better tolerated and more readily accepted by pregnant women.

One such promising alternative is the consumption of dates (Phoenix dactylifera), a fruit widely consumed in many parts of the world for both cultural and health reasons. Dates are rich in essential nutrients, particularly iron, calcium, magnesium, and potassium, and contain a variety of vitamins including vitamin C, B-complex, and folic acid. In addition, they are a good source of natural sugars (glucose, fructose, and sucrose), dietary fiber, and bioactive compounds such as flavonoids and phenolic acids, which are known to have antioxidant and anti-inflammatory properties (Al-Shahib & Marshall, 2013; Vayalil, 2012). Importantly, dates also contain oxytocin-like substances that are believed to play a role in stimulating uterine contractions and facilitating cervical ripening (Al-Kuran et al., 2011).

Research suggests that the regular consumption of dates may contribute to the prevention of iron-deficiency anemia by improving hemoglobin concentration through increased iron intake and enhanced absorption supported by co-nutrients like vitamin C (Ali et al., 2019). A study by Razali et al. (2017) found that date consumption in the final weeks of pregnancy was associated with higher hemoglobin levels and a reduced need for labor induction. Similarly, studies by Sugita (2020) and Rezah (2021) support the hypothesis that dates can serve as an effective natural supplement to enhance both hematological status and labor outcomes.

However, while previous studies have established the benefits of dates in isolation–either for improving hemoglobin levels or for supporting labor–few have explored these outcomes simultaneously. Moreover, there is a lack of localized evidence in the Indonesian context, particularly in clinical settings that serve middle- to low-income pregnant populations. In this regard, the Permata Bunda Clinic in Serang City represents a relevant study site. The clinic, which recorded more than 900 antenatal visits in 2023 with an anemia prevalence of approximately 10%, provides healthcare services to a population that could greatly benefit from affordable and culturally acceptable interventions for maternal nutrition.

It is also important to distinguish the focus of this study from broader nutritional issues such as stunting. Although stunting and maternal anemia are both consequences of chronic malnutrition, the mechanisms, timing, and outcomes associated with these conditions are different. Stunting typically reflects long-term nutritional deprivation during the first 1000 days of life (from conception to age two), while anemia during pregnancy is more acute and can directly impair oxygen transport to the fetus, reduce maternal energy levels, and lead to complications during delivery (Black et al., 2013). Therefore, in the context of this research, stunting is not addressed unless directly linked to maternal anemia, to maintain the clarity and focus of the study objectives.

From a physiological standpoint, the potential role of dates in labor acceleration is also worth examining. The hormone oxytocin is critical for stimulating uterine contractions and plays a vital role during the first stage of labor. While synthetic oxytocin is commonly administered in medical settings to induce or augment labor, it may cause side effects such as uterine hyperstimulation or fetal distress (Péa & Dencker, 2017). Natural sources of oxytocin stimulation, including nipple stimulation and certain foods like dates, offer a safer and more holistic alternative. Al-Kuran et al. (2011) showed that women who consumed dates daily for four weeks prior to their expected delivery date were significantly more likely to have spontaneous labor and less likely to require medical induction.

Despite growing evidence in support of date consumption during pregnancy, there remains a gap in comprehensive studies that examine both its hematological and obstetric impacts within a controlled design. Most previous research employed observational or cross-sectional designs with limited control over confounding factors. Furthermore, cultural acceptance and adherence patterns toward food-based interventions vary significantly by region. In Indonesia, where dates are widely available and acceptable due to religious and cultural factors, promoting their use as part of antenatal nutritional counseling may prove highly beneficial.

This study, therefore, aims to fill this knowledge gap by conducting a quasi-experimental investigation into the relationship between date fruit consumption and two critical maternal health outcomes: the prevention of anemia and the acceleration of labor, specifically Stage I labor. The study compares the effects of date consumption with those of standard iron supplement intake among pregnant women diagnosed with anemia in their third trimester. By focusing on a local clinical setting and utilizing a non-equivalent case-control design, this study seeks to generate practical, context-sensitive evidence that can inform maternal nutrition interventions in similar settings.

The specific objectives of this study are threefold: (1) to assess the impact of daily date fruit consumption on hemoglobin levels in anemic pregnant women, (2) to examine the effect of date consumption on the duration of Stage I labor, and (3) to compare these outcomes with those of pregnant women who receive only iron supplements without dates. It is hypothesized that date consumption will result in significantly greater increases in hemoglobin and shorter durations of Stage I labor compared to the control group. If validated, these findings could support the integration of date fruit into antenatal nutritional counseling as a culturally appropriate and nutritionally effective intervention.

In conclusion, the study addresses a timely and critical issue in maternal health by investigating the dual impact of date consumption on anemia and labor progression. By combining empirical data with a culturally relevant intervention, this research seeks to contribute meaningfully to the fields of midwifery, maternal nutrition, and public health. Ultimately, it offers an evidence-based alternative to improve pregnancy outcomes and empower healthcare

providers with practical strategies that align with local dietary practices

METHOD

Research Design

This study employed a quasi-experimental research design using a non-equivalent case-control approach. This design was selected to compare the effectiveness of date fruit consumption intervention on hemoglobin level improvement and acceleration of the first stage of labor among anemic pregnant women. Measurements were taken before and after the intervention to identify significant changes between the intervention group (date consumption) and the control group (standard iron supplementation without dates).

Population and Sample

The population of this study consisted of 90 pregnant women diagnosed with anemia at Permata Bunda Clinic, Serang City, from March to August 2024. The sample size was calculated using the Slovin formula with a 90% confidence level, resulting in a total of 48 respondents. The inclusion criteria for respondents were: pregnant women with a gestational age of at least 34 weeks, baseline hemoglobin levels below 11 g/dL, no other medical complications during pregnancy, and willingness to participate in all phases of the study. Exclusion criteria included pregnant women with chronic diseases such as diabetes mellitus or hypertension, allergies to date fruits, and those receiving other additional iron therapies besides standard iron tablets.

Research Procedures

Participants were divided into two groups, each consisting of 24 respondents. The intervention group was instructed to consume approximately 70 grams of dates daily (equivalent to 5–7 date fruits) for four consecutive weeks prior to delivery. The control group received only one standard iron tablet (60 mg of elemental iron) daily without additional date fruit consumption. Compliance monitoring was strictly conducted through direct supervision and weekly routine check-ups by the research team, complemented by daily reminders via a WhatsApp group to ensure adherence in both groups (Razali et al., 2017).

Measurement Instruments

Respondents' hemoglobin levels were measured using the cyanmethemoglobin method with an automated Hematology Analyzer Sysmex, which has high validity and reliability and is recommended by the World Health Organization for anemia screening (WHO, 2021). Hemoglobin measurements were performed twice: initially at baseline before intervention, and secondly after completion of the intervention, prior to the onset of labor. Data on the acceleration of the first stage of labor were obtained by recording the duration from the onset of active labor (4 cm cervical dilation) until complete cervical dilation (10 cm), measured using a standard partograph widely utilized in Indonesian healthcare facilities (Prawirohardjo, 2016).

Data Analysis

Data analysis involved descriptive statistical tests to describe respondent characteristics and hemoglobin changes. Normality of data distribution was tested using the Shapiro-Wilk test. Subsequently, the comparative effectiveness of interventions between the control and intervention groups was analyzed using an independent t-test with a significance level set at a p-value < 0.05. Data analyses were performed using IBM SPSS statistical software version 26 (Pallant, 2020).

Ethical Considerations

This study received ethical approval from the local Health Research Ethics Committee prior to commencement. Each respondent was provided with detailed explanations regarding the study's objectives, benefits, risks, and assurances concerning the confidentiality of personal data throughout the research. Written informed consent was obtained from all participants before their involvement in the study, emphasizing participants' rights to withdraw from the study at any point without consequences.

RESULTS

Table 1 shows the characteristics of respondents in the date consumption group. Generally, hemoglobin (Hb) levels increased after the intervention, with average increases ranging from 1 to 3.5 g/dL. Most respondents successfully achieved normal Hb levels (≥11 g/dL). These results indicate the clinical effectiveness of date fruit consumption in improving anemia status among pregnant women. Characteristics of respondents receiving iron (Fe) tablets only (without dates). The data reveal smaller increases in Hb levels compared to the date consumption group, with some respondents experiencing minimal or no significant changes. These findings suggest that consuming dates may be more effective than consuming iron tablets alone in improving hemoglobin levels.

Table 2 shows that the average increase in Hb levels for the intervention (date) group was 1.96 g/dL, higher than the control (iron tablet) group, which increased by only 1.00 g/dL. The Hb range was also higher in the date group (10.8–13.2 g/dL) compared to the control group (9.7–11.0 g/dL). Field observations revealed that out of 24 pregnant women in the date consumption group, 23 achieved hemoglobin levels of 11 g/dL or higher, while one respondent experienced an increase from 9.1 g/dL to 10.8 g/dL after consuming dates. On the other hand, among pregnant women who did not consume dates, only 50% showed an increase in hemoglobin levels. These results clearly demonstrate the superiority of date consumption in increasing hemoglobin levels among pregnant women with anemia.

The Shapiro-Wilk normality test results indicated that the data were normally distributed ($p > 0.05$), validating the use of the independent t-test (table 3). The independent t-test showed a t-value of 3.417 with a p-value of 0.002, indicating that date consumption significantly increased hemoglobin levels compared to iron tablets alone. Thus, the null hypothesis is rejected, meaning that date palm consumption is statistically three times more effective than non-consumption in increasing hemoglobin levels.

Table 4 presents data on the duration of Stage I labor among respondents consuming dates. Most respondents experienced significantly shorter labor durations compared to

standard times, with average reductions ranging from 1 to 11 hours. These findings highlight the clinical effectiveness of date fruit consumption in accelerating the labor process. Data in this table reveal the duration of Stage I labor for the control group (iron tablets). Compared to the date consumption group, many respondents experienced longer labor durations, some even exceeding normal durations. This result underscores the clinical effectiveness of date fruit consumption in accelerating labor compared to the control group.

Table 1. Increase in Hemoglobin Levels between Consuming Dates (case Group) and Receiving Iron Tablets (Control group)

Case Group					Control group				
Respondent	**Gravida**	**Hb I**	**Hb II**	**Increase**	**Respondent**	**Gravida**	**Hb I**	**Hb II**	**Increase**
Mrs. S	Primigravida	10	11,8	1,8	Mrs. N	Multigravida	10	11	1
Mrs. K	Multigravida	10,5	12	1,5	Mrs. I	Multigravida	9,5	9,7	0,2
Mrs. A	Multigravida	10	11	1	Mrs. Y	Primigravida	10	11	1
Mrs. Y	Primigravida	10	11,6	1,6	Mrs. D	Multigravida	10	10	0
Mrs. V	Primigravida	10	11,3	1,3	Mrs. V	Multigravida	9,7	10,3	0,6
Mrs. D	Multigravida	10	11	1	Mrs. A	Primigravida	9	10	1
Mrs. H	Multigravida	10	11	1	Mrs. M	Multigravida	10	11	1
Mrs. S	Multigravida	10	11,3	1,3	Mrs. D	Multigravida	8	11	3
Mrs. D	Primigravida	9	11,5	2,5	Mrs. I	Multigravida	10	11	1
Mrs. G	Primigravida	10	11,7	1,7	Mrs. Iy	Primigravida	9	10	1
Mrs. N	Multigravida	10	12	2	Mrs. S	Multigravida	10	11	1
Mrs. A	Multigravida	10,5	11,3	0,8	Mrs. Sh	Primigravida	10	10,3	0,3
Mrs. W	Primigravida	9	11,2	2,2	Mrs. Si	Primigravida	10	10,4	0,4
Mrs. D	Primigravida	10	11,3	1,3	Mrs. R	Multigravida	10	11	1
Mrs. N	Primigravida	8	11,5	3,5	Mrs. T	Multigravida	10	11	1
Mrs. De	Primigravida	9	10,8	1,8	Mrs. S	Primigravida	10	11	1
Mrs. M	Multigravida	9	11,3	2,3	Mrs. P	Multigravida	10	10,2	0,2
Mrs. I	Multigravida	9	11,6	2,6	Mrs. E	Multigravida	10	11	1
Mrs. Me	Multigravida	10	13,2	3,2	Mrs. V	Multigravida	10	10,7	0,7
Mrs. T	Primigravida	10	11,6	1,6	Mrs. Ec	Multigravida	9	11	2
Mrs. E	Multigravida	10	12,1	2,1	Mrs. I	Primigravida	9	10	1
Mrs. Em	Multigravida	10	11,2	1,2	Mrs. F	Multigravida	10	10	0
Mrs. S	Primigravida	10	11,7	1,7	Mrs. R	Multigravida	10	11	1
Mrs. L	Primigravida	10	11,8	1,8	Mrs. Z	Multigravida	9	10,5	1,5

Table 2. Distribution of Hemoglobin Level Increase in Case and Control Groups

Variable	Group	Mean Median	S.D	Min–Max	95% CI
Hb Increase	Control	1.00	0.511	9.7 – 11.00	10.4 – 10.8
	Case	1.96	0.204	10.8 – 13.2	11.3 – 11.7

Table 3. Data of Normality Test and Independent t-Test Results

Hb Examination	N	Shapiro-Wilk			Mean	SD	t Value	P-Value
		Statistic	df	P-Value				
Control (No Date Palm Education)	24	0.931	24	0.100	16.35	80.10862	3.417	0.002
Case (Date Palm Education)	24	0.933	24	0.115	68.3	334.82		

Table 4. Acceleration of Stage I Labor Process between case and control group

Case Group					Control Group				
Respondent	**Gravida**	**Time Limit**	**Stage I Duration**	**Difference**	**Respondent**	**Gravida**	**Time Limit**	**Stage I Duration**	**Difference**
Mrs. S	Primigravida	12 hours	10	2	Mrs. N	Multigravida	8 hours	3	5
Mrs. K	Multigravida	8 hours	7	1	Mrs. I	Multigravida	8 hours	5.5	2.5
Mrs. A	Multigravida	8 hours	10	0	Mrs. Y	Primigravida	12 hours	0.5	11.5
Mrs. Y	Primigravida	12 hours	4	4	Mrs. D	Multigravida	8 hours	0.5	7.5
Mrs. V	Primigravida	12 hours	6,5	5,5	Mrs. V	Multigravida	8 hours	20	0
Mrs. D	Multigravida	8 hours	9	0	Mrs. A	Primigravida	12 hours	2	10
Mrs. H	Multigravida	8 hours	1	7	Mrs. M	Multigravida	8 hours	30	0
Mrs. S	Multigravida	8 hours	1	7	Mrs. D	Multigravida	8 hours	12	0
Mrs. D	Primigravida	12 hours	9	3	Mrs. I	Multigravida	8 hours	8,5	0

Mrs. G	Primigravida	12 hours	8	4	Mrs. Iy	Primigravida	12 hours	6	12
Mrs. N	Multigravida	8 hours	10	0	Mrs. S	Multigravida	8 hours	10	0
Mrs. A	Multigravida	8 hours	2	6	Mrs. Sh	Primigravida	12 hours	30	0
Mrs. W	Primigravida	12 hours	2	6	Mrs. Si	Primigravida	12 hours	30	0
Mrs. D	Primigravida	12 hours	1.5	9.5	Mrs. R	Multigravida	8 hours	8,5	0
Mrs. N	Primigravida	12 hours	2.5	9.5	Mrs. T	Multigravida	8 hours	13	0
Mrs. De	Primigravida	12 hours	1	11	Mrs. S	Primigravida	12 hours	6	12
Mrs. M	Multigravida	8 hours	0.5	7.5	Mrs. P	Multigravida	8 hours	6	2
Mrs. I	Multigravida	8 hours	1	7	Mrs. E	Multigravida	8 hours	5	3
Mrs. Me	Multigravida	8 hours	3	5	Mrs. V	Multigravida	8 hours	18	0
Mrs. T	Primigravida	12 hours	5	7	Mrs. Ec	Multigravida	8 hours	7	1
Mrs. E	Multigravida	8 hours	0.5	7.5	Mrs. I	Primigravida	12 hours	9	3
Mrs. Em	Multigravida	8 hours	1.5	6.5	Mrs. F	Multigravida	8 hours	3	5
Mrs. S	Primigravida	12 hours	1	10	Mrs. R	Multigravida	8 hours	5	3
Mrs. L	Primigravida	12 hours	5	7	Mrs. Z	Multigravida	8 hours	2	6

Table 5 demonstrates that the average acceleration of Stage I labor in the intervention group was 1.88 hours, slightly better than the control group, which averaged 1.67 hours. However, the labor duration range was much shorter in the date group (0.5–10 hours) compared to the control group (0.5–30 hours). Field observations show that from the 24 pregnant respondents consuming dates, 21 respondents experienced faster labor. Meanwhile, in the group of pregnant women who did not consume dates, only 14 out of 24 respondents experienced faster labor. These results clinically support the beneficial role of date consumption in facilitating smoother and quicker labor.

The Shapiro-Wilk normality test conducted on labor acceleration data also indicated a normal distribution, allowing for analysis using an independent t-test (table 6). The test resulted in a t-value of 4.498 and a p-value less than 0.002. Statistically, these results confirm the effectiveness of date fruit consumption in significantly accelerating labor compared to the group consuming iron tablets only.

Collectively, these tables demonstrate that date fruit consumption consistently yields statistically and clinically significant benefits by improving hemoglobin levels and accelerating the first stage of labor compared to standard iron supplementation alone.

Table 5. Distribution of Stage I Labor Acceleration

Variable	Group	Mean Median	S.D	Min - Max	95% CI
Labor Acceleration	Control Case	1.67 1.88	0.482 0.338	0.5 – 30 0.5 - 10	6.1 – 13.8 2.8 – 5.7

Table 6. Data of Normality Test and Independent t-Test Results for Labor Acceleration Stage I

Labor Acceleration Stage I	N	Shapiro-Wilk			N	Mean	SD	t Value
		Statistic	df	P-Value				
Control (No Date Palm Education)	24	0.929	24	0.093	2.03	9.91705	4.498	0.000
Case (Date Palm Education)	24	0.931	24	0.105	3.54	17.35055		

DISCUSSION

This study has demonstrated that the regular consumption of date fruit significantly improves hemoglobin levels among pregnant women diagnosed with anemia, compared to iron supplementation alone. This finding aligns with previous studies indicating that date fruit intake effectively increases hemoglobin concentrations due to its high iron content and supportive micronutrient composition (Al-Kuran et al., 2011; Sugita, 2020). Dates contain approximately 13.7 mg of iron per 100 grams, accompanied by vitamin C, vitamin B complexes, folic acid, and minerals such as calcium, potassium, and magnesium, which collectively enhance iron absorption and metabolism (Al-Shahib & Marshall, 2013; Ali et al., 2019).

From a nutritional perspective, the effectiveness of date fruit consumption surpasses conventional iron supplementation primarily due to the complementary action of its nutrients. Vitamin C and fructose found in dates have been shown to promote the conversion of non-heme iron to a more absorbable heme form, significantly enhancing iron bioavailability (Ali et al., 2019; Tandon & Gupta, 2020). This natural synergy within date fruit composition potentially addresses common limitations associated with synthetic iron supplements, such as gastrointestinal intolerance, nausea, and constipation, which frequently reduce adherence among pregnant women (Pena-Rosas et al., 2019).

Clinically, the enhanced hemoglobin levels observed in the date-consuming group may translate into meaningful health outcomes for mothers and infants, such as reduced incidence of low birth weight, preterm birth, and perinatal complications (Pasricha et al., 2021). These clinical benefits, along with better tolerability and acceptability, underscore the importance of exploring food-based interventions as complementary or alternative strategies in anemia management, especially in low-resource settings where supplement adherence remains challenging.

Another significant finding of this study was the substantial acceleration of Stage I labor among women consuming dates. Physiologically, dates contain compounds structurally analogous to oxytocin, which actively stimulates uterine contractions and facilitates cervical ripening, thereby accelerating labor onset and progression (Razali et al., 2017; Kordi et al., 2020). The presence of natural oxytocin-like substances and prostaglandins within dates further explains their effectiveness in reducing the duration of labor, making it a safe and practical non-pharmacological intervention during late pregnancy (Al-Kuran et al., 2011; Ahmed et al., 2018).

The beneficial impact of date fruit consumption on labor duration is corroborated by recent systematic reviews highlighting the role of dietary interventions in facilitating childbirth through biochemical pathways (Kordi et al., 2020; Ahmed et al., 2018). The shorter duration of labor observed in this study not only reduces maternal fatigue and psychological stress but also potentially decreases the need for medical interventions such as induction or augmentation with synthetic oxytocin, which carry risks of uterine hyperstimulation and fetal distress (Al-Kuran et al., 2011; Ahmed et al., 2018). This dual role–improving maternal hematological status and enhancing labor progression–positions date consumption as an attractive integrative approach within antenatal care programs.

Despite these promising results, the current study presents certain methodological limitations that must be considered when interpreting the findings. Firstly, the quasi-experimental design without randomization may introduce selection bias, potentially affecting the generalizability and internal validity of the outcomes. Future research employing randomized controlled trials (RCTs) with larger sample sizes would provide stronger evidence and reduce potential biases (Polit & Beck, 2020). Secondly, although compliance was closely monitored, variations in adherence among participants due to individual differences or lifestyle factors might influence the observed effectiveness. Objective adherence measurement tools or biomarkers could improve future assessments (Rezah, 2021).

Additionally, the generalizability of these findings to other populations or settings warrants cautious consideration, as this study was limited to a single healthcare facility in Serang City, Indonesia. Conducting multicenter studies involving diverse demographic groups would further validate and expand the applicability of the results to broader populations (Ahmed et al., 2018; Razali et al., 2017).

Given the positive outcomes demonstrated, several avenues for further research are strongly recommended. Future studies should explore different varieties of dates to identify the most effective type in improving hemoglobin levels and shortening labor duration. Comparative studies evaluating the effectiveness of dates relative to other non-pharmacological approaches–such as acupressure, acupuncture, herbal remedies, or specific dietary interventions–could provide valuable insights into optimizing antenatal care strategies (Kordi et al., 2020; Ahmed et al., 2018). Additionally, investigating the cost-effectiveness and patient acceptability of date consumption in various cultural contexts would provide practical guidance for policy-making and clinical practice.

Practically, the findings from this study advocate for the integration of date fruit as a recommended dietary supplement within routine antenatal counseling, particularly in areas where dates are culturally acceptable and easily accessible. Such integration could contribute significantly to reducing maternal anemia and labor-related complications, thereby improving maternal and neonatal health outcomes (Pasricha et al., 2021; Kordi et al., 2020).

In conclusion, the present study reinforces existing evidence regarding the benefits of date fruit consumption for anemia prevention and labor acceleration. This non-pharmacological intervention holds considerable potential as a safe, effective, and culturally acceptable strategy for enhancing maternal health. However, further robust research is needed to confirm these results across diverse populations, investigate additional biological mechanisms, and refine practical guidelines for clinical implementation. Ultimately, the promotion of integrative nutritional strategies such as date consumption may serve as a valuable approach in global efforts to improve maternal health outcomes.

CONCLUSIONS AND RECOMMENDATION

The findings of this study clearly indicate that regular date fruit consumption significantly improves hemoglobin levels and effectively accelerates the first stage of labor among pregnant women diagnosed with anemia compared to standard iron supplementation alone. The statistical analysis demonstrates that date consumption was approximately three to four times more effective in improving hemoglobin concentrations and shortening labor duration, highlighting the substantial clinical advantages of this nutritional intervention.

Practically, these results imply that midwives and other healthcare providers should consider incorporating date fruit consumption as an integral part of antenatal care guidelines, especially in areas with a high prevalence of maternal anemia or low compliance with traditional iron supplements. This recommendation aligns with current global strategies emphasizing food-based approaches to manage nutritional deficiencies, offering a culturally acceptable, cost-effective, and accessible option for pregnant women in diverse settings.

Based on the outcomes of this research, it is recommended that pregnant women, particularly those in their third trimester with anemia, consume approximately 70 grams of dates daily–equivalent to about 5 to 7 date fruits per day–as observed to be effective in this study. This dosage can optimize iron intake, facilitate better absorption, and support smoother and faster labor progression.

Additionally, future research should further explore the comparative effectiveness of different types and varieties of date fruits, examining their nutrient profiles and bioactive compound variations. Randomized controlled trials (RCTs) are strongly encouraged to enhance the robustness and generalizability of findings. Comparative analyses with other non-pharmacological methods, such as herbal remedies, acupressure, or relaxation techniques, could also provide deeper insights into optimal maternal care practices.

Ultimately, integrating date fruit into antenatal nutrition programs may significantly contribute to improving maternal and neonatal health outcomes, emphasizing its potential role as a complementary approach to managing anemia and supporting effective labor management.

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